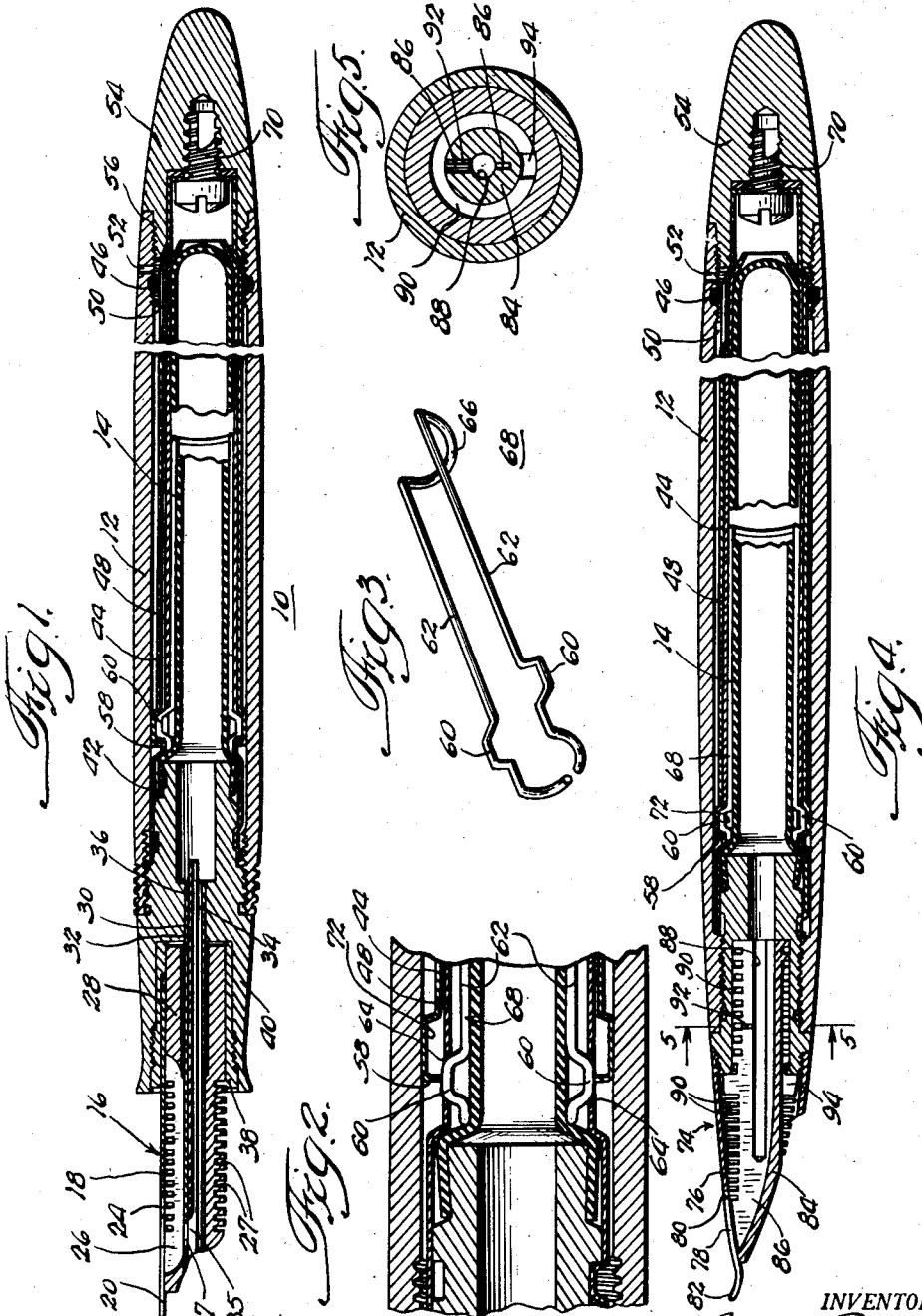


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L. P. MARTIN  
WRITING IMPLEMENT  
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2,802,449



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2,802,449

WRITING IMPLEMENT

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7 Claims. (Cl. 120—46)

This invention relates to writing implements and more particularly to an improved filling means for writing implements. It is an important object of this invention to provide an improved filling means for fountain pens which will insure against leakage of writing fluid therefrom.

In filling fountain pens of the types generally known, the forward portion of the pen is inserted in a body of fluid and the writing fluid is drawn inwardly into a reservoir contained in the barrel of the pen over the paths normally traversed by the fluid and air in subsequent writing operations. Thus in the filling operation the expansion chambers and venting channels provided in the forward portion of fountain pens are generally filled with writing fluid, creating a condition whereby a change of pressure or temperature subsequent to the filling operation will cause a discharge of writing fluid from the instrument often with concomitant damage to clothing and the like. For this reason it is usually necessary to blot or wipe the pen point in order to drain fluid contained in the expansion chamber and venting passageways.

It is, therefore, another object of this invention to provide filling apparatus which will prevent leakage of writing fluid from a writing instrument under various atmospheric conditions immediately subsequent to a filling operation.

It is another object of this invention to provide improved filling apparatus for fountain pens which will purge the communicating channels and expansion chambers of fluid immediately subsequent to filling.

It is another object of this invention to provide improved filling apparatus for fountain pens which will automatically drain the expansion chamber thereof.

It is still another object of this invention to provide improved filling apparatus for fountain pens which will automatically clear the expansion chamber during a filling operation.

It is a further object of this invention to provide automatic means for clearing the expansion chambers of a fountain pen immediately subsequent to a filling operation, said means being actuated upon conditioning the pen for writing.

Further and additional objects of this invention will appear from a consideration of this description, the accompanying drawing, and the appended claims.

In one embodiment of this invention a fountain pen is provided having a barrel and a flexible sac contained therein. The flexible sac comprises a fluid reservoir and is in communication with a writing portion positioned at the forward end of the barrel. Means is provided for substantially collapsing the sac to effect the drawing inwardly of fluid from the writing portion during subsequent sac expansion. A lever or other means is provided which is associated with the filling means and actuated upon completion of a filling operation to reduce temporarily the available volume for the flexible sac reservoir either to prevent maximum expansion of the

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flexible reservoir or to expel a portion of writing fluid therefrom. During the filling step, the writing point and the expansion chambers are normally immersed in the fluid supply, and upon conditioning the fountain pen for writing (after withdrawal of the writing portion from the fluid supply), the lever is shifted to its normal position, allowing the flexible sac to expand to its normal position, drawing fluid from the expansion chamber back into the reservoir. In other words, since the pen is removed from the body of fluid prior to conditioning the pen for writing, the fluid drawn into the reservoir at that time results in evacuation of the expansion chamber which is provided in the writing portion. Thus, though the expansion chamber and communicating passageways from the point to the reservoir are charged with writing fluid during a filling operation, conditioning the pen for writing will cause the fluid contained therein to be withdrawn into the reservoir, leaving the air venting passageways and expansion chamber clear.

For a more complete understanding of this invention reference should be made to the accompanying drawings, wherein

Figure 1 is a longitudinal sectional view of one embodiment of this invention;

Fig. 2 is an enlarged partial view of the central portion of Fig. 1, illustrating the change of position during a filling operation;

Fig. 3 illustrates the sac collapsing mechanism utilized in the embodiment of Fig. 1;

Fig. 4 is a longitudinal sectional view of a second embodiment of this invention; and

Fig. 5 is a sectional view taken along the line 5—5 of Fig. 4.

Referring now to the drawings and more particularly to Fig. 1, a fountain pen 10 is provided having a barrel 12 containing a reservoir 14 which comprises a flexible sac. A writing portion 16 is positioned forwardly of the reservoir 14 and in communication therewith. The writing portion comprises a nib 18 having a capillary slit 20 therein communicating with a writing point 22. The slit 20 terminates in a pierce 24, the slit and pierce being juxtaposed against a capillary fissure 26 formed in a feed bar 28. The feed bar 28 has a central aperture therein which receives a tubular member 30 containing an insert 32 which provides a fluid passageway from the forward end of the feed bar 28 to the reservoir 14. The insert 32 has a cross section whereby a large channel 34 is provided which will readily pass fluid upwardly during a filling operation and a restricted passageway 36 comprising a groove in the insert 32 of capillary dimensions which will provide a fluid passageway during both filling and writing operations, all as disclosed in the copending application of Lynn P. Martin, Serial No. 368,852, filed July 20, 1953. The passageway 34 will generally be cleared of fluid during writing and provide an air passageway whereby the reservoir 14 is vented to the atmosphere to insure free flow of fluid therefrom. During writing, fluid flows from the reservoir 14 along the capillary path 36 to a capillary slot 35 formed in the forward end of insert 32. The capillary slot 35 is aligned with a corresponding capillary aperture 37 in the tube 30 which passes fluid to the juxtaposed capillary fissure 26 in the feed bar 28. A comb-like expansion chamber 27 is formed in the feed bar 28 in communication with the fissure 26. The annular comb cuts 27 formed around the bar 28 are of such dimension that they will not normally be charged with writing fluid but will retain fluid in the event that atmospheric conditions cause a discharge from the reservoir 14. The writing portion 16 is secured in the barrel 12 by frictional engagement in a collar 38 which threadably engages a gripping section 40. The gripping section 40 is in turn threadably in-

serted within barrel 12. The flexible reservoir 14 is secured to the rearward portion of the gripping section 40 at juncture 42, and an air tight seal therebetween is insured either by clamping or crimping by a suitable ring (not shown) or by appropriate cementing.

The filling mechanism of this embodiment is similar to that disclosed in Martin Patent No. 2,610,612 and comprises a telescoping tube 44 which is reciprocable within the barrel 12 to produce an air chamber therein of varying volume depending upon the relative positioning of the tube and the barrel. A substantially airtight seal is provided between the tube and barrel by the annular packing gland 46. A coaxial sheath 48 is provided to surround the flexible reservoir 14 and to prevent engagement of the telescoping tube 44 therewith during reciprocation. Thus the reservoir 14 is maintained in its substantially longitudinal extended position without being collapsed or distorted by contact with the reciprocating parts.

A longitudinally extending groove 50 is formed in the tube 44 at the rearward portion thereof to provide a bypass from the internal chamber to an air vent 52 formed in the pen barrel 12. Thus when the tube is in the position shown in Fig. 1 the internal chamber is continuously vented to the atmosphere through groove 50 and vent 52, whereby atmospheric conditions are maintained within the chamber. Furthermore, when filling the pen herein described the tube 44, which is secured to the cap 54 of the barrel by screw 70, is reciprocated, moving backwardly or to the right in Fig. 1, and then returned to a position approaching that shown in Fig. 1, while the writing portion 16 is maintained within a body of fluid. During the return motion, the chamber within the barrel 12 is substantially reduced in volume, causing a compression of the air within the chamber and consequent collapse of the reservoir 14. Upon completion of the reciprocating travel the groove 50 bridges the packing gland 46, venting the chamber to the atmosphere and allowing the flexible sac 14 to return to its normal dimensions. This will cause the fluid to rise upwardly through the channels 34 and 36 to substantially fill the sac 14. While a single groove 50 is generally found sufficient, a plurality of grooves may be provided for more adequate venting.

The tube 44 will not assume the position shown in Fig. 1 solely upon axial movement of the tube and cap 54. Such axial movement will bring the forward end of cap 54 into abutting relationship with the outermost thread of threads 56, which will determine the extent of axial retraction of the mechanism. When the cap 54 has assumed this position, the parts will be relatively disposed as shown in Fig. 2. Thus, the forward flange 58 of tube 44 is in engagement with protrusions 60 extending outwardly from the legs 62 of a resilient member 68 which lie longitudinally juxtaposed along a substantial portion of the flexible sac 14. The protrusions 60 extend outwardly through apertures 64 in the sheath 48. Thus upon completing the axial motion of tube 44 over the reservoir 14, the reservoir expands to a diameter somewhat less than its normal maximum diameter at the forward end thereof, whereby the reservoir is not filled to its maximum capacity but is capable of drawing a small quantity of fluid therein when the sac 14 is permitted to extend to its maximum dimensions. Thus upon rotating cap 54 relative to barrel 12, the corresponding threaded portions 56 thereof will engage, producing an additional axial movement of tube 44, which results in the forward flange 58 of the tube 44 assuming a position whereby protrusions 60 spring outwardly and are disposed within the annularly formed portion 72 of tube 44 in the position shown in Fig. 1. During the rotation of cap 54 for conditioning the pen for writing, the writing portion 16 of the fountain pen will have been withdrawn from the body of fluid, whereby the additional expansion of sac 14 to its full diameter in the forward portion ad-

acent to the resilient member 68 will draw the writing fluid contained within channel 34 and expansion chamber 27 rearwardly into the reservoir. Thus if the fountain pen is then placed in a pocket or the like for storage without wiping or blotting, the channel 34 and the expansion chamber 27 will have been cleared of writing fluid, whereby changes in atmospheric pressure and temperature will cause the excess fluid discharged from the reservoir 14 to be safely retained within the chamber and channel, thus avoiding undesirable leakage.

The resilient member 68 which is contained within the sheath 48 and in contact with flexible sac 14 is clearly shown in Fig. 3. As there shown, the longitudinal portions 62 are resiliently connected by a curved end portion 66 at the rearward end thereof, and protrusions 60 extend outwardly from each of the longitudinal members 62. The member 68 is retained within the sheath 48 by resilient engagement therewith and is maintained in the desired position by the protrusions 60 extending outwardly through apertures 64.

The embodiment of Figs. 4 and 5 operates in substantially the same manner as that above described. This embodiment utilizes the same filling means as that shown above, which includes a resilient sac reservoir 14 contained within a sheath 48 and is collapsible under compression resulting from reciprocation of the telescoping tube 44 maintained in sealing engagement with the barrel 12 by the packing gland 46. The tube 44 is secured to cap 54 by a screw 70 as above described. The chamber within barrel 12 is vented to the atmosphere through longitudinally extending groove 50 and aperture 52 in barrel 12. In this embodiment a member 68 is provided which is substantially identical to the member 68 of Fig. 1 and has a pair of protrusions 60 extending outwardly through apertures in the sheath 48. The protrusions 60 are engageable by the forward flange 58 of the tube 44 during a normal filling operation to reduce the maximum volume of the expanded sac 14 as a result of the displacement of member 68. Upon conditioning the fountain pen for writing by threadably engaging cap 54 with barrel 12, the protrusions 60 will extend outwardly into an annular recess 72 formed in telescoping tube 44 rearwardly of forward flange 58, whereby member 68 will shift outwardly to lie against sheath 48, thus allowing sac 14 to expand to its maximum dimensions. As described above, this additional expansion will draw writing fluid upwardly from the expansion chamber into the reservoir.

The writing portion 74 of the pen of Fig. 4 comprises a nib 76 having a capillary slit 78 extending between a pierce 80 and writing point 82. The nib 76 substantially surrounds a feed bar 84 which has a capillary fissure 86 extending through the major portion thereof and communicating with an axial bore 88. A plurality of comb cuts 90 are formed about the periphery of feed bar 84 to provide an expansion chamber to retain excess writing fluid under unusual conditions of atmospheric pressure or temperature. A transverse channel 92 is provided to connect the axial bore 88 with the expansion chamber to facilitate flow of fluid and air therebetween.

Thus in filling, the forward end of the implement is immersed and writing fluid is drawn upwardly through the various openings in the lower portion of the feed bar 84 and enters the axial bore 88 to fill reservoir 14. In writing, however, fluid will be withdrawn from axial bore 88 through fissure 86 which latter is in communication with the capillary slit 78 to provide writing fluid to point 82. During writing, scoop cut 94, transverse channel 92 and comb cuts 90 will be cleared of writing fluid to provide an air vent to replace the fluid used in writing and thus insure steady fluid flow. By this invention the transverse channel 92, scoop cut 94, and comb cuts 90 will be cleared immediately subsequent to a filling operation by the operation of resilient member 68. The fluid will be withdrawn from these relatively large channels by the cohesion of the fluid molecules whereby the channels will

be substantially cleared without the entrapment of air within the reservoir. This has also been found to be true in the embodiment of Fig. 1. Therein it has been found that substantially all of the fluid contained within the channel 34 and expansion chambers 27 will be withdrawn therefrom into the reservoir 14 before any air will be drawn inwardly from the forward end of channel 34.

Without further elaboration, the foregoing will so fully explain the character of my invention that others may, by applying current knowledge, readily adapt the same for use under varying conditions of service, while retaining certain features which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims.

I claim:

1. In a writing instrument having a fluid expansion chamber, a collapsible resilient generally tubular fluid reservoir in communication with said expansion chamber, a tubular member surrounding said reservoir, a tubular sleeve associated with said tubular member to form a sealed chamber enclosing said reservoir and axially slidable between extended and coextending positions relative to said tubular member, and means defining a fluid vent passageway providing communication between the sealed chamber and the atmosphere when said tubular sleeve is substantially in the coextending position; means for draining the expansion chamber subsequent to a filling operation comprising an elongate resilient reservoir engaging member axially fixed in said instrument, said resilient member and said tubular sleeve having axially aligned normally interfitted portions and said sleeve having an adjacent inwardly extending portion momentarily engageable with the interfitted portion of said resilient member upon relative movement of said sleeve to momentarily depress said resilient member against the reservoir to effect partial collapse of said reservoir, said reservoir assuming its normal tubular shape following said momentary collapse.

2. In a writing instrument, a fluid expansion chamber, a collapsible resilient generally tubular fluid reservoir in communication with said expansion chamber, a tubular member surrounding said reservoir, a tubular sleeve associated with said tubular member to form a sealed chamber enclosing said reservoir and axially slidable between extended and coextending positions relative to said tubular member, means defining a fluid vent passageway providing communication between the sealed chamber and the atmosphere when said tubular sleeve is substantially in the coextending position, and means for draining the expansion chamber subsequent to a filling operation comprising an elongate resilient reservoir engaging member axially fixed in said instrument, said resilient member and said tubular sleeve having axially aligned normally interfitted portions and said sleeve having an adjacent inwardly extending portion momentarily engageable with the interfitted portion of said resilient member upon relative movement of said sleeve to momentarily depress said resilient member against the reservoir to effect partial collapse of said reservoir, said reservoir assuming its normal tubular shape following said momentary collapse.

3. In a writing instrument having a fluid expansion chamber, a collapsible resilient generally tubular fluid reservoir in communication with said expansion chamber, a tubular member surrounding said reservoir, a tubular sleeve associated with said tubular member to form a sealed chamber enclosing said reservoir and axially slidable between extended and coextending positions relative to said tubular member, and means defining a fluid vent passageway providing communication between the sealed chamber and the atmosphere when said tubular sleeve is substantially in the coextending position; means for draining the expansion chamber subsequent to a filling operation comprising a resilient reservoir engaging member axially fixed in said instrument, and protrusion means

extending outwardly from said resilient member, said tubular sleeve normally surrounding said resilient member and having a portion interfitted with said protrusion and an adjacent portion extending inwardly from said interfitted portion whereby said adjacent portion engages said protrusion means upon movement of said sleeve to the coextending position to momentarily depress said resilient member inwardly against said reservoir to effect partial collapse of said reservoir, said reservoir assuming its normal tubular shape following said momentary collapse.

4. In a writing instrument having a fluid expansion chamber, a collapsible resilient generally tubular fluid reservoir in communication with said expansion chamber, a tubular member surrounding said reservoir, a tubular sleeve associated with said tubular member to form a sealed chamber enclosing said reservoir and axially slidable between extended and coextending positions relative to said tubular member, and means defining a fluid vent passageway providing communication between the sealed chamber and the atmosphere when said tubular sleeve is substantially in the coextending position; means for draining the expansion chamber subsequent to a filling operation comprising a longitudinally extending resiliently mounted member in juxtaposition with said reservoir and contained within said tubular sleeve, protruding means extending outwardly from said resilient member, and a protrusion on said sleeve axially aligned and interfitted with said protruding means and having an adjacent inwardly extending portion engageable therewith during movement of said sleeve to the coextending position when said sleeve is substantially in the coextending position whereby said resilient member momentarily compresses said reservoir, said reservoir assuming its normal tubular shape following said momentary compression.

5. In a writing instrument having a fluid expansion chamber, a collapsible resilient generally tubular fluid reservoir in communication with said expansion chamber, a tubular member surrounding said reservoir, a tubular sleeve associated with said tubular member to form a sealed chamber enclosing said reservoir and axially slidable between extended and coextending positions relative to said tubular member, and means defining a fluid vent passageway providing communication between the sealed chamber and the atmosphere when said tubular sleeve is substantially in the coextending position; means for draining the expansion chamber subsequent to a filling operation comprising a rigid apertured sheath mounted in said instrument and surrounding said reservoir within said tubular member and sleeve, a longitudinally extending resilient member mounted within said sheath in juxtaposition with said reservoir, protruding means extending outwardly from said resilient member through the apertured portions of said sheath, and a protrusion on said sleeve axially aligned and interfitted with said protruding means and having an adjacent inwardly extending portion engageable therewith during movement of said sleeve to the coextending position and when said sleeve is substantially in the coextending position whereby said resilient member momentarily compresses said reservoir, said reservoir assuming its normal tubular shape following said momentary compression.

6. In a writing instrument, an instrument body, a fluid expansion chamber mounted in said body, a collapsible resilient generally tubular fluid reservoir within said body in communication with said expansion chamber, a tubular sleeve axially slidable between extended and coextending positions relative to said body, annular seal means between said body and tubular member to form a sealed chamber enclosing said reservoir, means defining a fluid vent passageway by-passing said seal means when said sleeve is substantially in the coextending position, a rigid apertured sheath mounted in said body and surrounding said reservoir within said sleeve, a longitudinally extending resilient member mounted within said sheath in juxtaposition with said reservoir, protruding means extending

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outwardly from said resilient member through the apertured portions of said sheath, and a protrusion on said sleeve axially aligned with said protruding means and having an adjacent inwardly extending portion engageable therewith during movement of said sleeve to the coextending position and when said sleeve is substantially in the coextending position whereby said resilient member is depressed inwardly against said reservoir to momentarily compress said reservoir, said reservoir assuming its normal tubular shape following said momentary compression.

7. In a writing instrument, an instrument body, a fluid expansion chamber mounted in said body, a collapsible resilient generally tubular fluid reservoir within said body in communication with said expansion chamber, a tubular sleeve axially slidable between extended and coextending positions relative to said body, a cap portion mounted on said sleeve and threadedly engaging said body when said sleeve is substantially in the coextending position, annular seal means between said body and tubular member to form a sealed chamber enclosing said reservoir, means defining a fluid vent passageway by-passing said seal means when said sleeve is substantially in the coextending position, a rigid apertured sheath mounted in said

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body and surrounding said reservoir within said sleeve, a longitudinally extending resilient member mounted within said sheath in juxtaposition with said reservoir, protruding means extending outwardly from said resilient member through the apertured portions of said sheath, and a protrusion on said sleeve axially aligned with said protruding means and having an adjacent inwardly extending portion engageable therewith during movement of said sleeve to the coextending position and when said sleeve is threadedly engaged with said body and substantially in the coextending position whereby said resilient member is depressed inwardly against said reservoir to momentarily compress said reservoir, said reservoir assuming its normal tubular shape following said momentary compression.

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